Estimating Attrition in School-Based Evaluation Studies: Guidance from State Longitudinal Data in Maryland

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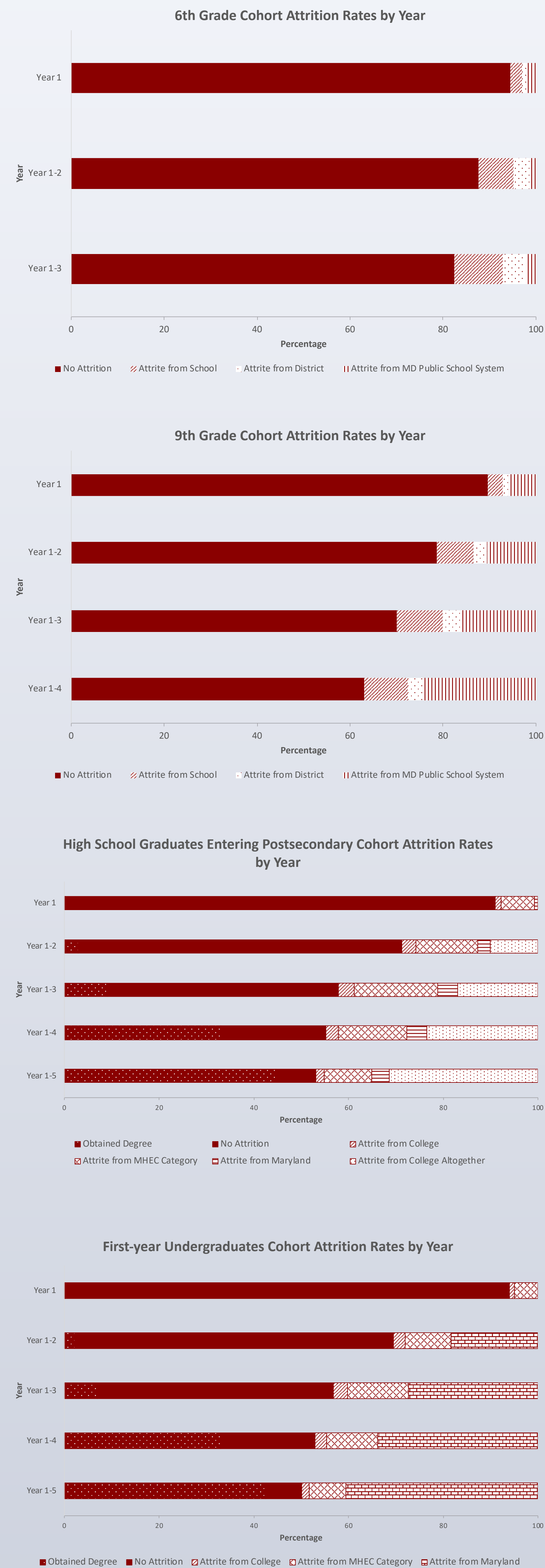UNIVERSITY OF MARYLAND — COLLEGE OF EDUCATION

Introduction

School-based evaluation studies often take the form of randomized controlled trials (RCTs) to limit selection bias between treatment and control groups. Estimating the power to detect a sizeable effect is critical for the planning and proper implementation of RCTs. Prior research indicates that studies funded by the National Center for Education Research (NCER) tend to underestimate the minimum detectable standardized effect size (MDES), indicating a mismatch between estimated power and precision and actual power and precision after carrying out the trial (Spybrook & Raudenbush, 2009). Attrition from study populations represents a serious threat to study validity and limits the ability to detect effects in school-based research. Furthermore, attrition is typically not random, further threatening the validity of school-based studies. A recent review of 132 evaluation studies with student-, teacher-, or school-level random assignment reported that the median attrition rate was 24% (Rickles, Zeiser, & West, 2019).

The purpose of this study was to use statewide longitudinal administratively collected data from the population of Maryland students attending public middle (MS) and secondary (HS) schools and public and private postsecondary (PS) institutions to provide estimates of student attrition (1) over time; (2) over grade level; (3) for specific student subgroups; and (4) for specific types of schools.
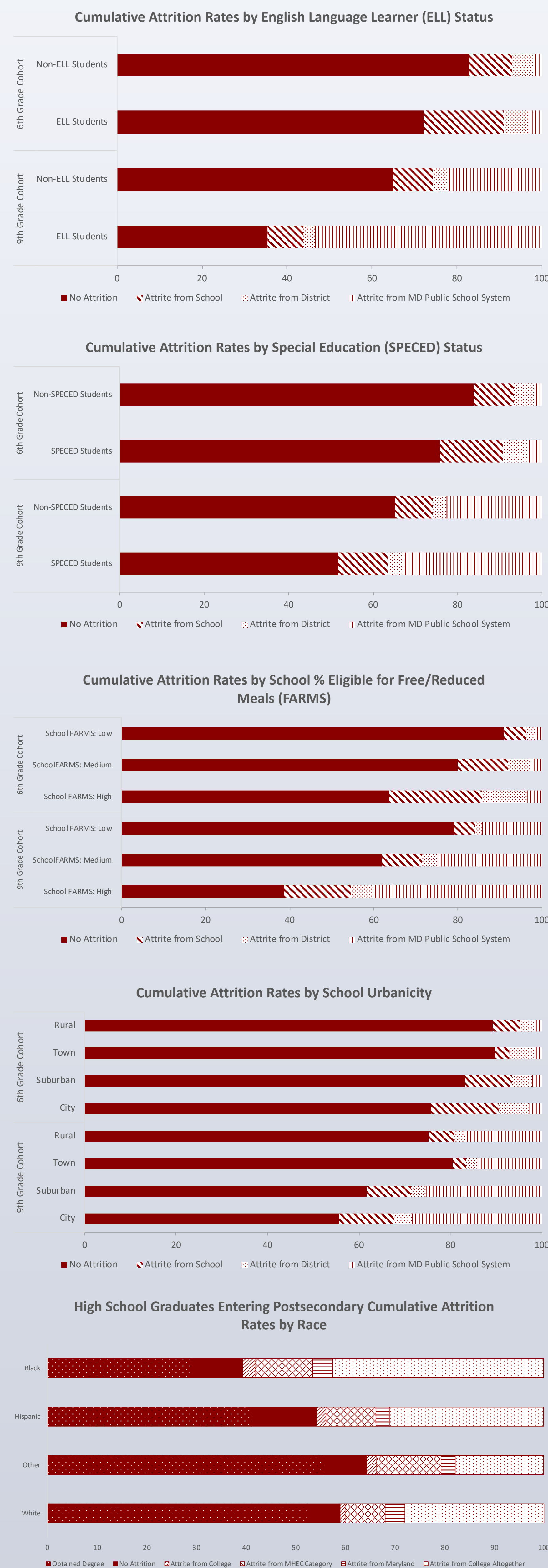
Method

- Data were from the Maryland Longitudinal Data System (MLDS), Maryland's statewide repository for individual-level education and workforce data that are longitudinally linked across three state agencies.
- The MS cohort included all 6th grade students enrolled in eligible MD public middle schools in the 2014-2015 academic year (N=60,062).
- The HS cohort included all 9th grade students enrolled in eligible MD public high schools in the 2013-2014 academic year (N=71,555).
- The HS-PS cohort included all students who graduated from MD public high schools in the 2012-2013 academic year and enrolled in college in Fall 2013 as first-time degree-seeking undergraduates in any state (N = 23,237; Associate degree seekers: 13,017, Bachelor's degree seekers: 10,220).
- The PS cohort included all first-time degree-seeking undergraduates in all MD colleges in Fall 2013 (N = 43,580; Associate degree seekers: 23,401, Bachelor's degree seekers: 20,179).
- Student-level covariates were measured in the year of initial enrollment, and included (1) a binary variable indicating whether the student received English Language Learner (ELL) services, and (2) a binary variable indicating the student's special education (SPECED) status.
- School-level covariates were measured in the year of initial enrollment (or in the previous year in special cases). School-level covariates included (1) a categorical variable indicating the percentage of students in the school who were eligible for free/reduced meals (i.e., High, Medium, Low), and (2) a categorical variable indicating the location of each school (i.e., City, Suburban, Town, Rural).
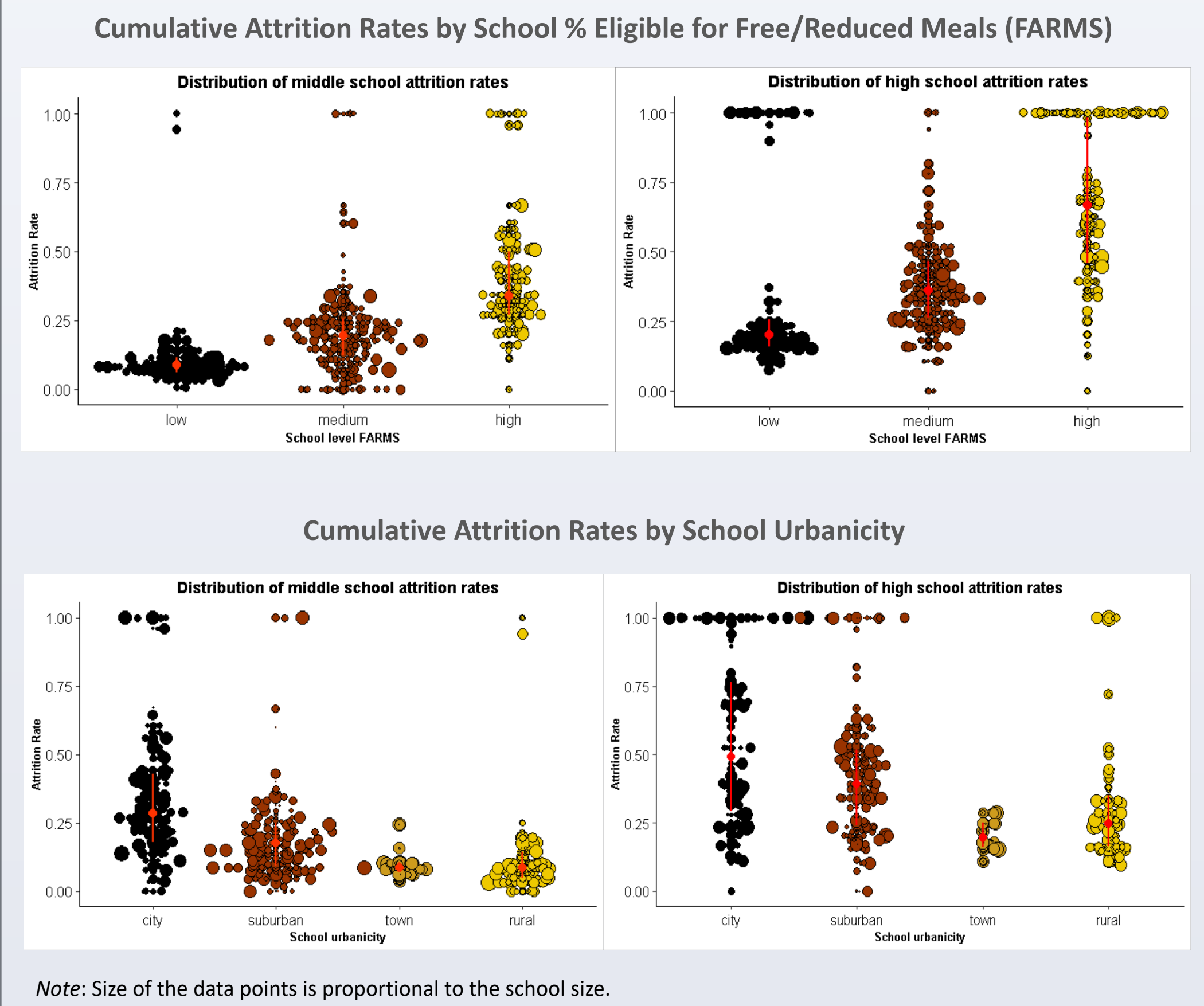
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Statewide Population Attrition Rates

6th Grade Cohort Attrition Rates by Year

9th Grade Cohort Attrition Rates by Year

High School Graduates Entering Postsecondary Cohort Attrition Rates by Year

First-year Undergraduates Cohort Attrition Rates by Year

Attrition Rates by Subgroup

Cumulative Attrition Rates by English Language Learner (ELL) Status

Cumulative Attrition Rates by Special Education (SPECED) Status

Cumulative Attrition Rates by School % Eligible for Free/Reduced Meals (FARMS)

Cumulative Attrition Rates by School Urbanicity

High School Graduates Entering Postsecondary Cumulative Attrition Rates by Race

Distribution of Attrition Rates in Middle and High School

Cumulative Attrition Rates by School % Eligible for Free/Reduced Meals (FARMS)

Cumulative Attrition Rates by School Urbanicity

Note: Size of the data points is proportional to the school size.

Discussion and Implications

- Higher attrition rates were observed in high schools compared to middle schools.
- For an evaluation study in high school, use of data that can track populations of students outside of the state system may be useful, given the high rates of out of state attrition for this population.
- For an evaluation study in middle school, it may be more cost effective to use district-level data since most students who attrite go to a different school within the district.
- Educational interventions often target special education students and English Language Learners (ELL). It may be necessary to oversample these populations of students to meet power needs.
- School-level educational interventions often target poor urban or rural schools. It may be necessary to oversample these schools to meet power needs.
- For an evaluation study in college, use of data that includes populations of students who move out of the state may be particularly useful. Additionally, a high proportion of students attrite from college altogether, which may necessitate a workforce linkage.
- Black, Hispanic and Other race students have higher attrition rates from college than White students. It may be necessary to oversample by race/ethnicity.
- The distribution of attrition across populations and schools has a large range, with some schools having very low rates of attrition and some having very high rates of attrition.

Acknowledgements

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